RevMexAA (Serie de Conferencias), **17**, 192–192 (2003)

A NEW SPECTRAL STELLAR LIBRARY FOR POPULATION SYNTHESIS

P. Sánchez–Blázquez,[1] J. Jimenez,[2] R. Peletier,[3] A. Vazdekis,[4] J. Gorgas,[1] N. Cardiel,[1] S. Selam[5] and J. Falcón[3]

A new spectral stellar library designed to be included in population synthesis models is presented. The library, which has been obtained at the INT 2.5 m telescope (La Palma) comprises $\sim$ 1100 stars and covers the spectral range $\lambda\lambda$3500-7500.

One of the major problems to study the stellar populations of early type galaxies is how to disentangle the effects of age and metallicity. This problem is in part due to the limitation of the analyses performed at low spectral resolution (FWHM$\sim$9Å). Recently, a new generation of evolutionar y stellar population synthesis models are able to predict not only individual features in a composite spectrum but also the whole spectral energy distribution at a resolution FWHM=1.8Å (Vazdekis 1999), allowing analysis of spectra at the dynamical resolution of each galaxy (as defined by its own σ). However, a stellar library with enough spectral resolution and parametric coverage it is still needed to feed the models. The most widely used library up to now is the Lick/IDS library (Gorgas et al. 1993; Worthey 1994). The Lick library has been very useful since it contains stars with a fair range on T_{eff}, log g, and [Fe/H]. However it presents a number of problems: S/N ratios are low, spectral resolution varies with wavelength (Worthey et al. 1997) and the spectra were not flux calibrated. Here we present a new library that mostly overcomes the limitations of previous libraries and when incorporated into the new models (Vazdekis 1999), will give us reliable predictions to face outstanding problems in galaxy formation and evolution, like age-metallicity degeneracy, or the role of the IMF, among others. The new library presents an unpredecented coverage of atmospheric parameters (see Fig. 1 where we compare the atmospheric parameters coverage of the Lick library with the new one) and has a resolution of $\sim$ 2Å. The atmospheric parameters of the stars have been thoroughly revised and transformed to homogeneous system following (Cenarro et al. 2002). The observations of the stars

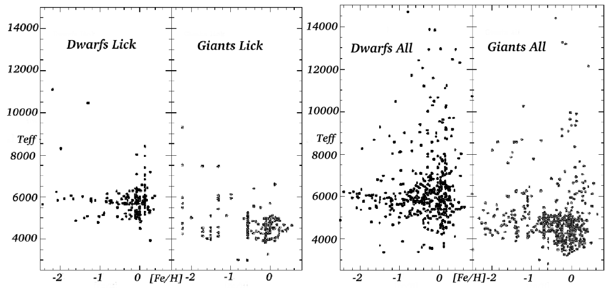

Fig. 1. The parameters coverage of the Lick/IDS database (left panel) is compared with the one of the new library (right panel)

were made between July 2001 and December 2002, distributed over five different runs. The data were taken with IDS using the Isaac Newton telescope (La Palma, Spain). To perform a reliable flux calibration, several spectrophotometric standards were observed along each night at different air masses. Because of differential refraction, care has been taken in order to obtain a good calibration. To avoid this problem each star has also been observed with a slit of 6". With this additional spectrum, we can construct a response curve for each star individually.

The improvements in the predictions of the models with high resolution libraries has already been shown by Vazdekis (1999) and Bruzual & Charlot (1993) using the libraries of Jones (1997) and Le Borgne (1999), respectively. The new library has no predecent in the combination of spectral range, resolution, number of stars and atmospheric parameter coverage.

REFERENCES

Bruzual A. G. & Charlot S., 1993, ApJ, 405, 538
Cenarro A.J., Gorgas J., Cardiel N., Vazdekis A., Peletier R.F., 2002 MNRAS, 329,863
Gorgas J., Faber S.M., Burstein D., González J.J., Courteau S. & Prosser C., 1993, ApJS, 86, 153
Jones L.A, 1997, Thesis, Univ. of North Carolina, Chapel Hill
Le Borgne, J.F, et al. 2002, A&A (in preparation)
Vazdekis A., 1999, ApJ, 513, 2244
Worthey G., 1994, ApJS, 95, 107
Worthey G. & Ottaviani D.L., 1997, ApJS, 111, 377

[1]Departamento de Astrofísica, U.C.M., 28040, Madrid, Spain
[2]Kapteyn Institute, Groningen, Netherlands
[3]University of Nottingham, UK
[4]Istituto Astrofísico de Canarias, Spain
[5]Ankara University Observatory, Ankara, Turkey

Galaxy Evolution: Theory and Observations (Cozumel, Quintana Roo, México, 8-12 April 2002)
Editors: Vladimir Avila-Reese, Claudio Firmani, Carlos S. Frenk & Christine Allen